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which should be cited to refer to this work.

Supplementary data

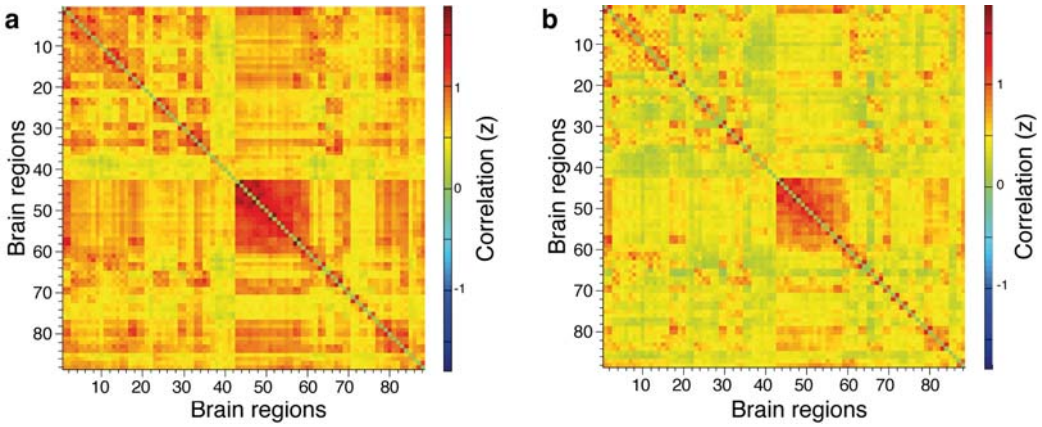

Figure 1: Average dynamic FC strength across time and separated for (a) HC subjects, (b) RRMS patients.

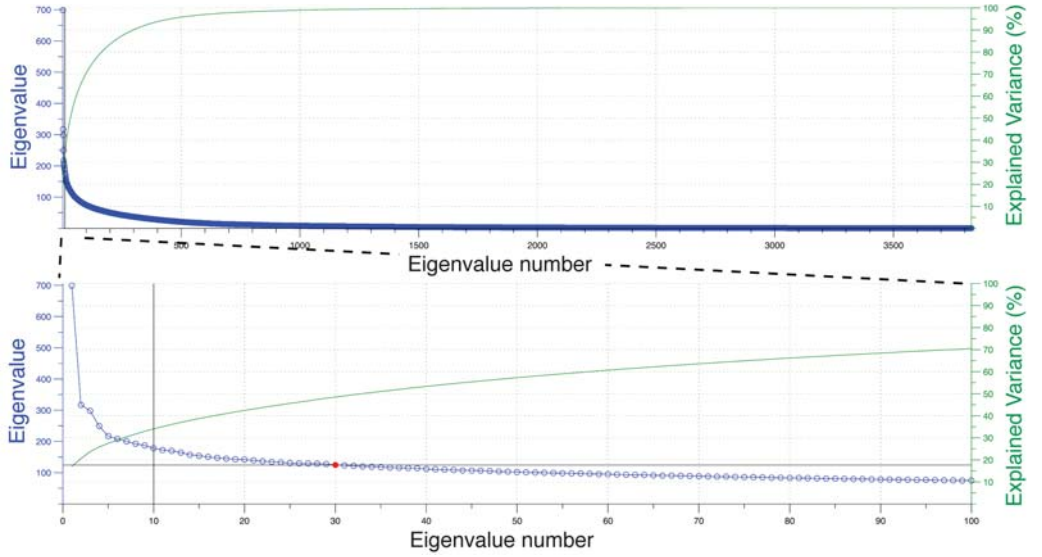

Figure 2: Plot of the eigenvalues $\lambda_1, \lambda_2, ..., \lambda_{3828}$ (blue), cumulative explained variance (green), 95th percentile of maximum eigenvalue in phase-randomized data ($n = 100$, corresponding to a corrected significance level of 5%), and selected cut-off based on sample size (black).

Number (L - R)	Region name	Lobe
1-2	Precentral gyrus (PreC)	Central
3-4	Superior frontal gyrus (SFG)	Frontal
5-6	Superior frontal gyrus (SFGorb), orbital	Frontal
7-8	Middle frontal gyrus (MFG)	Frontal
9-10	Middle frontal gyrus (MFGorb), orbital part	Frontal
11-12	Inferior frontal gyrus (IFGoper), opercular part	Frontal
13-14	Inferior frontal gyrus (IFGtri), triangular part	Frontal
15-16	Inferior frontal gyrus (IFGorb), orbital part	Frontal
17-18	Rolandic operculum (RolOp)	Central
19-20	Supplementary motor area (SMA)	Frontal
21-22	Olfactory cortex	Frontal
23-24	Superior frontal gyrus (SFG), medial	Frontal
25-26	Superior frontal gyrus (SFG), dorsolateral	Frontal
27-28	Gyrus rectus (Rect)	Frontal
29-30	Insula	
31-32	Anterior cingulate gyrus (ACC)	Limbic
33-34	Middle cingulate gyrus (MCC)	Limbic
35-36	Posterior cingulate gyrus (PCC)	Limbic
37-38	Hippocampus (HG)	Limbic
39-40	Parahippocampal gyrus (PAG)	Limbic
41-42	Amygdala	Limbic
43-44	Calcarine cortex	Occipital
45-46	Cuneus	Occipital
47-48	Lingual gyrus	Occipital
49-50	Superior occipital gyrus (SOG)	Occipital
51-52	Middle occipital gyrus (MOG)	Occipital
53-54	Inferior occipital gyrus (IFG)	Occipital
55-56	Fusiform gyrus	Occipital
57-58	Postcentral gyrus	Central
59-60	Superior parietal gyrus (SPG)	Parietal
61-62	Inferior parietal gyrus (IPG)	Parietal
63-64	Supramarginal gyrus (SupMarg)	Parietal
65-66	Angular gyrus (Ang)	Parietal
67-68	Precuneus (PreC)	Parietal
69-70	Paracentral lobule (ParaCen)	Frontal
71-72	Caudate	Subcortical
73-74	Putamen	Subcortical
75-76	Thalamus (Thal)	Subcortical
77-78	Heschl's gyrus	Temporal
79-80	Superior temporal gyrus (STG)	Temporal
81-82	Superior temporal pole (STP)	Temporal
83-84	Middle temporal gyrus (MTG)	Temporal
85-86	Middle temporal pole (MTP)	Temporal
87-88	Inferior temporal gyrus (ITG)	Temporal

Table 1: Region number (left - right), name (abbreviation) and lobe defined in the AAL atlas

Table 2: Connections with different average FC strength between HC subjects and RRMS patients

Connection between ...	and ...	Cohen's d (corrected p value)
R precentral gyrus (2)	R IFG (54)	2.1 (0.01)
L mid frontal (7)	R MTP (86)	2.0 (0.02)
R IFG, triangular part (14)	L insula (29)	2.0 (0.03)
R medial SFG (24)	R rolandic operculum (18)	2.1 (0.01)
	L rectus gyrus (27)	2.0 (0.02)
L dorsolateral SFG (25)	R cuneus (46)	2.2 (0.01)
R dorsolateral SFG (26)	R MFG, orbital part (10)	1.9 (0.04)
	R SFG, medial (24)	2.4 (0.003)
	R thalamus (76)	2.6 (0.002)
L MCC (33)	R cuneus (46)	2.0 (0.04)
	L SOG (49)	2.0 (0.04)
R MCC (34)	L IFG, opercular part (11)	1.9 (0.04)
R PCC (36)	L IFG, orbital part (15)	2.0 (0.04)
L amygdala (region 41)	inferior occipital (53, 54)	2.1 (0.02), 2.8 (< 0.001)
	fusiform gyrus (55, 56)	2.4 (0.004), 2.0 (0.02)
	postcentral gyri (57, 58)	2.4 (0.005), 2.1 (0.02)
	L supramarginal gyrus (63)	2.2 (0.01)
	L angular gyrus (65)	2.0 (0.03)
	R STP (82)	2.0 (0.03)

Subject	Max head motion [°/mm]	Mean FD [mm]	Mean D [mm]
1	0.70°	0.13	0.03
2	1.30 mm	0.15	0.04
3	0.89°	0.17	0.08
4	1.30 mm	0.16	0.06
5	0.77 mm	0.19	0.08
6	0.77 mm	0.11	0.04
7	0.73 mm	0.22	0.07
8	0.32 mm	0.13	0.04
9	0.57°	0.19	0.07
10	0.68 mm	0.13	0.03
11	0.28 mm	0.13	0.04
12	1.1 mm	0.16	0.05
13	1.4°	0.15	0.05
14	0.58°	0.14	0.04
15	0.66°	0.16	0.05
16	0.46 mm	0.11	0.04
17	0.56 mm	0.10	0.03
18	0.68 mm	0.12	0.03
19	0.28 mm	0.20	0.04
20	0.50°	0.16	0.06
21	0.74 mm	0.12	0.05
22	0.36 mm	0.24	0.07
23	0.58°	0.13	0.03
24	0.24 mm	0.14	0.02
25	1.50 mm	0.22	0.09
26	0.87 mm	0.23	0.09
27	0.77 mm	0.10	0.04
28	0.42°	0.12	0.06

Table 3: Summary of subject motion. The second column lists the largest head motion parameter among the 6 parameters. Note that the first column lists absolute displacement while columns 2 and 3 list relative displacement between adjacent volumes.

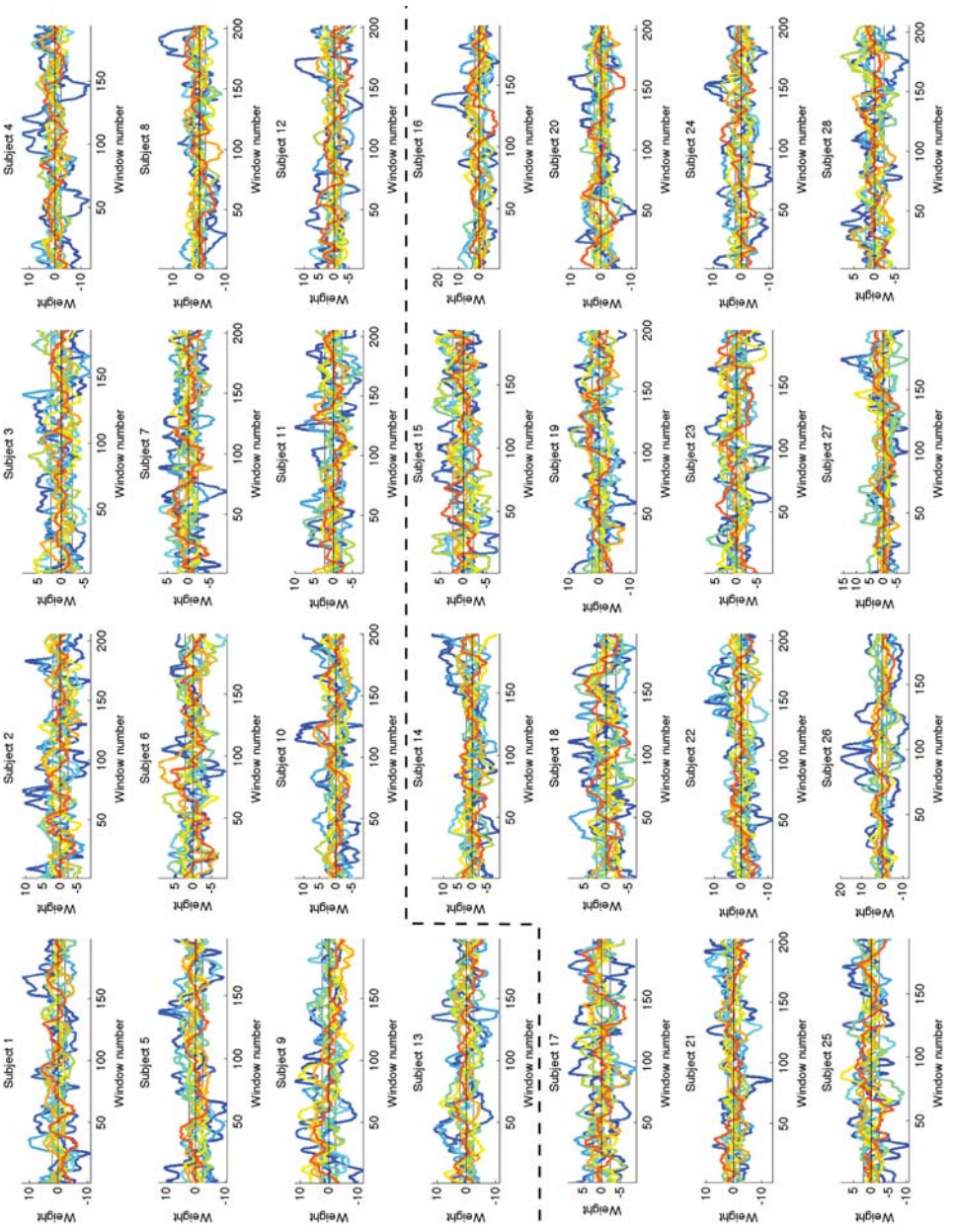

Figure 3: Time-dependent weights of eigenconnectivities $2-10$ for all subjects. Weights of eigenconnectivity 1 are not shown because it has a larger range than the others. Subject 6 is the one shown in the main manuscript, subjects 1-13 are HC subjects, 14-28 RRMS patients (separated by dashed line).

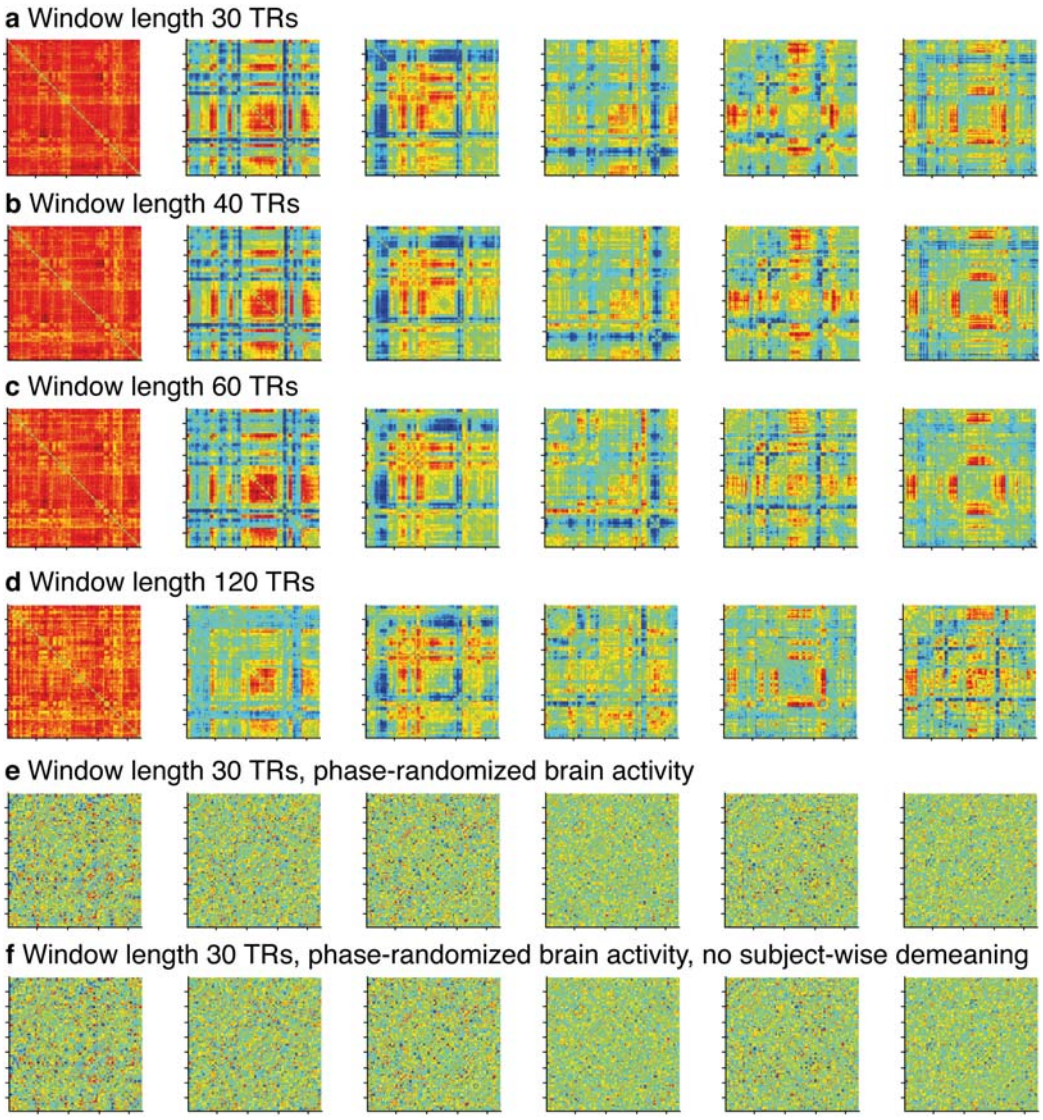

Figure 4: (a-d) Eigenconnectivities estimated using different window lengths. Note that the sign is essentially arbitrary, i.e., similar connectivity patterns that change from red to blue color for different window lengths encode similar information. (e-f) Eigenconnectivities estimated from phase randomized activity time courses with (e) and without (f) row-wise demeaning of each subject's dynamic FC matrix. Data matrix concatenated across time- and subject as for the original data. Colorbars are symmetric around zero